

**IN THE CLAIMS:**

- 1 1. (Previously presented) An electronically tuned circuit, comprising a power amplifier  
2 having an amplifier output wherein said amplifier output is coupled to provide  
3 amplified signal to an electronically tunable output network, said power amplifier  
4 capable of being operated in a large-signal mode, said output network including an  
5 electronically tunable reactive component, a control line, and a control input,  
6 wherein said control input is connected to a time varying non-DC tuning input  
7 signal, wherein electronic tuning of said electronically tunable reactive component  
8 includes non-motor operated electronic tuning when said power amplifier is operated  
9 in said large-signal mode, wherein said control line extends to said electronically  
10 tunable reactive component for providing a control signal derived from said time  
11 varying tuning input signal, wherein said control signal varies over more than two  
12 values for electronically varying reactance of said electronically tunable reactive  
13 component over more than two values, wherein said time varying non-DC tuning  
14 input signal is not derived from said amplifier output.
- 1 2. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said electronically tunable reactive component tunes said  
3 output network to a selected frequency.
- 1 3. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said electronically tunable reactive component tunes said  
3 output network to maintain a match between said output network and a varying load  
4 impedance .
- 1 4. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said electronically tunable reactive component adds modulation  
3 to a large signal in said output network.

- 1 5. (Previously presented) An electronically tuned circuit as in claim 4, wherein said  
2 varying reactance of said reactive component provides a power-amplifier  
3 load-impedance locus that substantially maximizes power-amplifier efficiency.
- 4 6. (Previously presented) An electronically tuned circuit as in claim 5, wherein said  
5 varying reactance of said reactive component causes said power-amplifier load  
6 impedance to follow a substantially resistive locus, thereby maintaining  
7 power-amplifier efficiency near maximum.
- 1 7. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said reactive component tunes said output network in  
3 accordance with a predetermined set of tuning inputs.
- 1 8. (Previously presented) An electronically tuned circuit as in claim 7, wherein said  
2 tuning inputs are selected in accordance with a lookup table.
- 1 9. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said reactive component tunes said output network in  
3 accordance with a predetermined lookup table of tuning inputs.
- 1 10. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said reactive component tunes said output network in  
3 accordance with a sample of the amplifier output.
- 1 11. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said reactive component tunes said output network in  
3 accordance with a sample of the network output.

- 1 12. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 varying reactance of said reactive component tunes said output network in  
3 accordance with a sample of a radiated signal.
- 1 13. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 electronically tunable reactive component includes an electronically tunable  
3 capacitor.
- 1 14. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a transistor.
- 1 15. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a diode.
- 1 16. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a diode having a control terminal.
- 1 17. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a micro electro-mechanical system device.
- 1 18. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a variable-dielectric material.
- 1 19. (Previously presented) An electronically tuned circuit as in claim 13, wherein said  
2 electronically tunable capacitor includes a piezo-electric device.

- 1 20. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 electronically tunable reactive component includes at least one inductive component  
3 adapted to be electronically tuned in inductance.
- 1 21. (Previously presented) An electronically tuned circuit as in claim 20, wherein said at  
2 least one inductive component includes a variable- permeability core.
- 1 22. (Previously presented) An electronically tuned circuit as in claim 20, wherein said at  
2 least one inductive component includes a piezo-electric device.
- 1 23. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 electronically tunable reactive component includes at least one transmission line  
3 adapted to be electronically tuned in electrical characteristics.
- 1 24. (Previously presented) An electronically tuned circuit as in claim 23, wherein said at  
2 least one transmission-line includes an electrically variable dielectric material.
- 1 25. (Previously presented) An electronically tuned circuit as in claim 23, wherein said at  
2 least one transmission-line includes an electrically variable magnetic material.
- 1 26. (Previously presented) An electronically tuned circuit as in claim 1, further  
2 comprising a passive filter coupled to said output network for removing undesired  
3 harmonic frequencies.
- 1 27. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 power amplifier includes an amplifier input, further comprising a second  
3 electronically tunable reactive component coupled to said amplifier input for tuning  
4 said amplifier input.

1 28. (Previously presented) An electronically tuned circuit as in claim 1, further  
2 comprising a controller, said controller for providing a signal for controlling said  
3 electronically tunable output network.

1 29. (Previously presented) An electronically tuned circuit as in claim 28, wherein said  
2 controller includes a controller input, further comprising an envelope detector with  
3 an envelope-detector input and envelope-detector output, said envelope-detector  
4 output coupled to said controller input, said envelope detector being responsive to an  
5 input RF signal and providing a modulation input to said controller.

1 30. (Previously presented) An electronically tuned circuit as in claim 28, further  
2 comprising a drive-level adjustor coupled for adjusting amplitude of a signal  
3 provided to said power amplifier.

1 31. (Previously presented) An electronically tuned circuit as in claim 1, further  
2 comprising a digital signal processor coupled to said power amplifier and to said  
3 electronically tunable output network, said processor for providing a drive signal to  
4 said power amplifier and said time varying tuning input signal to said electronically  
5 tunable output network.

1 32. (Previously presented) An electronically tuned circuit as in claim 31, further  
2 comprising a controller coupled to said digital signal processor and to said  
3 electronically tunable output network, wherein output of said digital signal processor  
4 is directed to said controller and wherein output of said controller is directed to said  
5 electronically tunable output network.

- 1 33. (Previously presented) An electronically tuned circuit as in claim 1, further  
2 comprising a drive-level adjustor coupled for adjusting amplitude of a signal  
3 provided to said power amplifier.
- 1 34. (Previously presented) An electronically tuned circuit as in claim 33, wherein said  
2 varying reactance of said reactive component and said drive-level adjuster add  
3 modulation to a large signal in said output network.
- 1 35. (Previously presented) An electronically tuned circuit as in claim 34, wherein when  
2 said time varying tuning input signal has an amplitude that is above a threshold said  
3 electronically tunable output network is used to control amplitude and when said  
4 time varying tuning input signal is below a threshold said drive level adjuster is used  
5 to control amplitude.
- 1 36. (Previously presented) An electronically tuned circuit as in claim 33, further  
2 comprising a controller for converting said time varying tuning input signal into  
3 tuning signals for control of said electronically tunable reactive component.
- 1 37. (Previously presented) An electronically tuned circuit as in claim 1, further  
2 comprising a bias input for controlling bias level of said power amplifier.
- 1 38. (Previously presented) An electronically tuned circuit as in claim 37, wherein said  
2 bias level is controlled to equal a minimum level necessary to enable operation of  
3 said power amplifier, thereby reducing power consumption.
- 1 39. (Previously presented) An electronically tuned circuit as in claim 37, further  
2 comprising a controller for adjusting said bias level in response to at least one from  
3 the group including frequency, impedance, and modulation inputs.

1        40. (Previously presented) An electronically tuned circuit comprising:

2                    (a)    means for power amplifying having an output, wherein said means for  
3                    power amplifying comprises a large-signal mode; and

4                    (b)    means for electronic tuning of said means for power amplifying when  
5                    said means for power amplifying is operating in said large signal  
6                    mode, wherein said means for electronic tuning is coupled to said  
7                    means for power amplifying for receiving an amplified signal, wherein  
8                    said means for electronic tuning comprises an electronically tunable  
9                    reactive component, a control line, and a control input, said control  
10                   input available for connection from external to said means for  
11                   electronic tuning, further wherein said control input is connected to a  
12                   time varying non-DC tuning input signal, wherein said electronically  
13                   tunable reactive component includes non-motor operated electronic  
14                   tuning, wherein said control line extends to said electronically tunable  
15                   reactive component for providing a control signal derived from said  
16                   time varying non-DC tuning input signal, wherein said control signal  
17                   varies over more than two values for electronically varying reactance  
18                   of said electronically tunable reactive component over more than two  
19                   values, wherein said time varying non-DC tuning input signal is not  
20                   derived from said means for amplifying output.

1        41. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2                   means for power amplifying operates in class E and said electronic-tuning means is  
3                   capable of being tuned to provide a reactance for optimum class-E operation for a  
4                   selected frequency.

1 42. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 means for power amplifying operates in class E and said electronic-tuning means is  
3 capable of being tuned to provide a reactance for optimum class-E operation while  
4 delivering power to a selected load impedance.

1 43. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 means for power amplifying operates in class E and said electronic-tuning means is  
3 capable of being tuned to provide a reactance for optimum class-E operation while  
4 simultaneously modulating the output of said electronic-tuning means.

1 44. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 means for power amplifying operates in class E and further comprising a fixed  
3 reactance for optimum class-E operation at a first frequency, wherein said means for  
4 electronic tuning is capable of being tuned to provide said power amplifying means  
5 with a load impedance for optimum class-E operation for a selected second  
6 frequency.

1 45. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 means for power amplifying operates in class E and further comprising a fixed  
3 reactance for optimum class-E operation with a first load impedance, wherein said  
4 means for electronic tuning is capable of being tuned to provide said power  
5 amplifying means with a load impedance for optimum class-E operation with a  
6 second load impedance different from said first load impedance.



1 46. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 means for electronic tuning is connected to an output terminal, wherein said means  
3 for power amplifying operates in class E and said means for electronic tuning is  
4 capable of being tuned to provide an impedance for optimum class-E operation when  
5 said output terminal is delivering a maximum output signal amplitude, and said  
6 means for electronic tuning is capable of being tuned to provide suboptimum class E  
7 operation when said output terminal is delivering less than a maximum output signal  
8 amplitude.

1 47. (Previously presented) An electronically tuned circuit as in claim 1, comprising a  
2 plurality of amplifier subsystems, wherein each of said amplifier subsystems includes  
3 one said power amplifier coupled to an electronically tunable output network,  
4 wherein said amplifier subsystems are coupled to a power combiner for delivery of  
5 signals from said amplifier subsystems to a common load.

1 48. (Previously presented) An electronically tuned power amplifier system as in claim  
2 47, wherein each said varying reactance of each said electronically tunable reactive  
3 component tunes said output network to a selected frequency.

1 49. (Previously presented) An electronically tuned power amplifier system as in claim  
2 47, wherein each said varying reactance of said electronically tunable reactive  
3 component tunes said output network to match a desired load impedance.

1 50. (Previously presented) An electronically tuned power amplifier system as in claim  
2 47, wherein each said varying reactance of each said electronically tunable reactive  
3 component adds modulation to a large signal in each said output network.

- 1 51. (Previously presented) An electronically tuned power amplifier system as in claim  
2 47, wherein said output networks are adapted to cancel reactances resulting from  
3 combining said signals.
- 1 52. (Previously presented) An electronically tuned power amplifier system as in claim  
2 47, further comprising a controller for generating drive and control signals for each  
3 subsystem.
- 1 53. (Previously presented) An electronically tuned power amplifier system as in claim  
2 52, wherein said controller is adapted to generating drive signals of different phases  
3 for production of an amplitude-modulated system output.
- 1 54. (Previously presented) An electronically tuned power amplifier system as in claim  
2 52, wherein said output networks are adapted to cancel time varying reactances  
3 resulting from combining out-of-phase signals.
- 1 55. (Previously presented) An electronically tuned power amplifier as in claim 47,  
2 further comprising a passive filter coupled to said power combiner for removing  
undesired harmonic frequencies and distortion products.

1 56. (Previously presented) An electronically tuned circuit, comprising one or more  
2 power amplifiers having an output, wherein said power amplifiers are capable of  
3 operating in a large-signal mode, further wherein said one or more power amplifiers  
4 has an output network for receiving an amplified signal, said output  
5 network including a tuning input, a network output, an electronically tunable reactive  
6 component, a control line, wherein said tuning input is connected to a time varying  
7 non-DC tuning input signal, wherein electronic tuning of said electronically tunable  
8 reactive component includes non-motor operated electronic tuning when said one or  
9 more power amplifiers are operating in said large-signal mode, wherein said control  
10 line extends to said electronically tunable reactive component for providing a control  
11 signal derived from said time varying non-DC tuning input signal, wherein said  
12 control signal varies over more than two values for electronically varying reactance  
13 of said electronically tunable reactive component over more than two values,  
14 wherein said time varying non-DC tuning input signal is not derived from said  
15 amplifier output.

1 57. (Previously presented) An electronically tuned circuit as in claim 56, wherein said  
2 varying reactance of said electronically tunable reactive component tunes said output  
3 network to a fixed or variable frequency.

1 58. (Previously presented) An electronically tuned circuit as in claim 56, wherein said  
2 varying reactance of said electronically tunable reactive component tunes said output  
3 network to maintain a match with a varying load impedance at said network output.

1 59. (Previously presented) An electronically tuned circuit as in claim 56, wherein said  
2 varying reactance of said electronically tunable reactive component adds modulation  
3 to a large signal in said output network.

- 1 60. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 output network includes at least two reactive components connected as a tuned  
3 circuit, wherein said electronically tunable reactive component includes at least one  
4 of said reactive components.
- 1 61. (Previously presented) An electronically tuned circuit as in claim 28, wherein said  
2 controller converts an input signal to a voltage suitable for controlling said tunable  
3 output.
- 1 62. (Previously presented) An electronically tuned circuit as in claim 1, wherein said  
2 electronically tunable reactive component is continuously variable.
- 1 63. (Previously presented) An electronically tuned circuit as in claim 40, wherein said  
2 electronically tunable reactive component is continuously variable.
- 1 64. (Previously presented) An electronically tuned circuit as in claim 56, wherein said  
2 electronically tunable reactive component is continuously variable.